

THE FISH IN LAKE MAGADI

BY C. W. WOODHOUSE

In the shallow soda springs which feed Lake Magadi there are found some small fish which have been identified by Mr. Boulenger of the British Museum as *Tilapia mossambica*. They were discovered by Mr. F. W. Graham and were stated by Mr. Boulenger to be immature.

These fish were observed and studied again in the month of December 1911, by the present writer, and were found at that time to be breeding, ova and fry in all stages of development being secured.

The habitat of these fish is interesting.

Lake Magadi is situated in a depression of the Rift Valley at an altitude of about 2,000 ft. The surrounding country is arid and waterless for a long way on each side of the lake. The nearest actual water is the Southern Guaso Nyiro River situated on the west of the lake, some fifteen miles from the springs on the east side of the lake where the fish occur.

The springs on the east side come out from under the cliffs which surround the lake and flow over the silica and into the mother liquor of the soda itself. This water is highly charged with soda and averages a depth of from one to three inches. The fish appear to congregate as near the origin of the water as possible, although they are not averse to going some way down towards the soda itself.

The composition of the water is as follows :—

The solids are principally sodium carbonate with traces of magnesium carbonate, sodium chloride and sodium bicarbonate. Shade temperature, 9.30 A.M., 92°F.

It is a physical impossibility for the first occurrence of these fish to have been water-borne, as their situation in regard to the neighbouring country precludes this, unless they are survivors (who have taken to shallow water) of the period when Lake Magadi was not solid or comparatively so. Should this be the case, they will probably be found to have developed local variations.

The more probable theory of their introduction may be taken that some ova adhered to the bills or legs of some of the pelicans, flamingoes or duck which frequent the lake. And from this start they have increased and multiplied.

Their habits are briefly as follows :—

The males appear to be greatly in excess of the females. The males may be readily recognised when sexually mature by their brighter colouring, iridescence, the white of the lower lip more pronounced, absence of vertical barring, and usually by their larger size.

The female is duller in colouring, barred vertically, and when gravid considerably swollen, usually fewer in number and smaller in size.

A primitive nest is prepared for the reception of the ova in the sandy mud. The work appears to be done entirely by the male, but the places prepared appeared to be used by many different individuals.

A male selects a favourable spot, often near a large stone. A space of some three inches across is diligently cleaned of obstructions, such as the green algæ-like growth that coats the bottom of the springs, small stones, &c. These are moved by the male taking each article in his mouth and depositing it on the edges of the depression thus caused. When this is finished, one or more females deposit their ova which are later fertilized by the male. The process appears to be similar to that employed by other fish, the abdomen being pressed against the bed of the nest, the fish propelling itself forward at the same time. After the operation, other fish appear to deposit their ova and milt. Various males appear to keep a cursory guard over the nest, driving away other fish in the neighbourhood, but long before the fish are hatched the males' interest in the nest appears to evaporate. The ova are speedily covered with the green vegetable deposit and disappear. As soon as the fish start to hatch there is a rush of all the neighbouring fish, and as many alevins and ova as can be found are devoured by the adults. The greater portion of the specimens of alevins collected were from the stomachs of fish engaged in thus robbing nests. Those that escape the cannibalistic propensities of their relatives hide themselves in the algæ. On absorption

of the yolk-sack they move into the shallowest water possible, from one to half an inch in depth.

After passing through the fry stage, the slightly bigger fish betake themselves to the reeds and grass growing in the springs and when nearly adult come out into the open and move about with the shoals.

Their food, besides ova and fry, appears to consist of water fleas (*Cyclops*) and vegetable matter. There being a very large number of fish in each spring, food material is apparently scarce.

This fact and the restricted area of their habitat appear to account for the fact of their stunted growth, three to three and a half inches being an exceptionally large fish. Their adaptability to the strength (in soda) and temperature of the water is also worthy of note.

In conclusion, every credit is due to Mr. F. W. Graham who first brought the occurrence of these fish to notice.

THE WATER-ELEPHANT

BY R. J. CUNINGHAME

M. Le Petit, who is at present in Nairobi, was for a period of five years travelling in the French Congo, and he has kindly furnished me with a somewhat detailed account of the Water-Elephant.

The first time he saw one was three and a half years ago (about June 1907) when travelling down the River Congo, near the junction of the River Kassai with the River Congo.

The second occasion was in the swampy country between Lake Leopold II and Lake Tumba near to where the M'fini River finds its exit from Lake Leopold II. This is in what is known as the Lukenye District.

His first view of a water-elephant was that of a head and neck only, at some considerable distance, appearing above the surface of the water; and he, being in a boat or native 'dug-out canoe,' thought it was a big tree-snag. The natives with him told him it was a water-elephant, and shortly afterwards